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RESEARCH MEMORANDUM

EFFECT OF A PILOT'S CANOPY ON THE DRAG OF AN NACA RM-2
DRAG RESEARCH MODEL IN FLIGHT AT TRANSONIC
AND SUPERSONIC SPEEDS

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1. Results of flight tests of an NACA RM-2 drag research model equipped with a pilot's canopy are presented for the Mach number range from 0.85 to 1.4. The corresponding Reynolds number range was from 30×10^6 to 48×10^6 based on the over-all length of the model. The basic body was a pointed cylinder having a nose fineness ratio of 5.0, an over-all fineness ratio of 12.8, and three stabilizing fins. The canopy was similar to those used on present-day high-speed airplanes, had a fineness ratio of about 7, and added about 10 percent to the maximum frontal area of the body. Details of the model are shown in figures 1 to 3.

2. The drag data were obtained by the Langley Pilotless-Aircraft Research Division at its testing station at Wallops Island, Va., by means of the standard NACA RM-2 technique (reference 1) and are presented in figure 4. The canopy added an almost constant increment in drag coefficient of approximately 0.08 (based on the frontal area of the basic body, 0.1364 sq ft) in the Mach number range from 1.0 to 1.4. When the drag coefficients of the canopy-equipped model are based on the frontal area of that model (0.1511 sq ft), they are still 5 to 9 percent higher than for the basic model.

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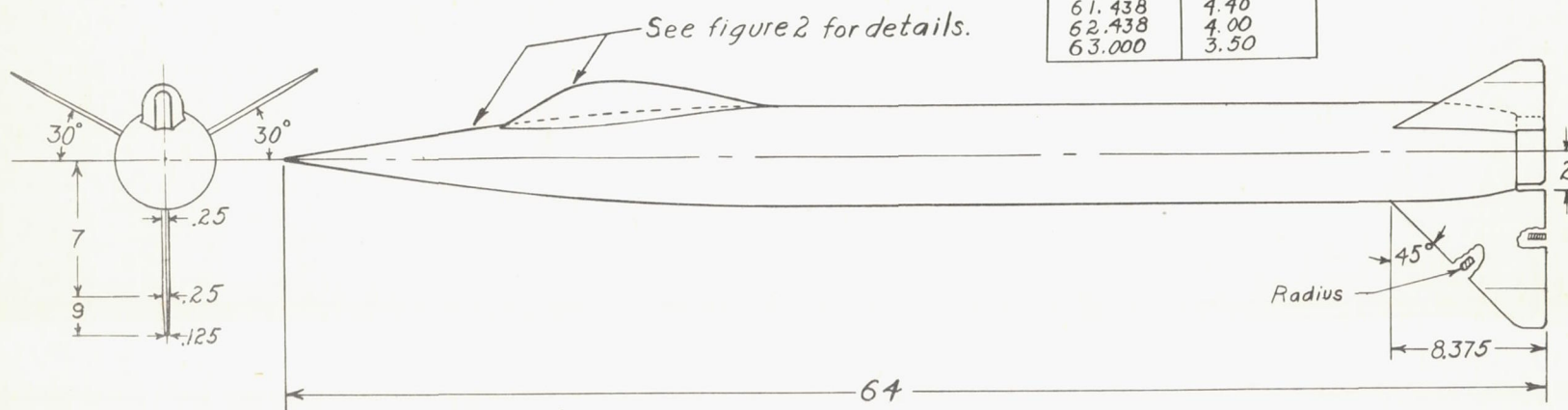
REFERENCE

1. Katz, Ellis R.: Results of Flight Tests at Supersonic Speeds to Determine the Effect of Body Nose Fineness Ratio on Body and Wing Drag. NACA RM No. L7B19, 1947.

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Boattail Profile

Distance from nose	Body diameter
57.438	5.00
58.438	4.96
59.438	4.88
60.438	4.66
61.438	4.40
62.438	4.00
63.000	3.50



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Figure 1.-General arrangement of NACA RM-2 model equipped with pilot's canopy. All dimensions are inches.

Canopy Section

		Sta.				
		14.28	15.45	16.48	17.84	19.99
R_2		0.215	0.500			
R_4		.278	.521			
R_6		.375	.570			
$Y \setminus X$						
3.32				0.695		
3.25	.549		.744	.792		
3.10	.646		.827	.862		
3.02	.730		.883	.910		
2.79	.799		.931	.952		
2.63	.848		.959	.980		
2.48	.890		.980	1.001		
2.33	.924		.994	1.008		
2.17	.938		.997	1.008		
2.02	.945		1.001	1.008		
3.26				0.695		
3.11				.771		
2.95				.834		
2.79				.890		
2.64				.924		
2.49				.952		
2.34				.973		
2.18				.987		
3.22				0.396		
3.06				.528		
2.91				.619		
2.76				.688		
2.61				.744		
2.45				.785		
2.29				.813		
$X \setminus Y$						
.076			3.86			
.153			3.84	3.73	3.38	
.229			3.82			
.306			3.79	3.67	3.29	
.348			3.77			
.466				3.56		
.619				3.38		

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Body and Canopy Profile

Sta.	R_b	H	R_f
3.571	0.61		
7.142	1.15		
10.714	1.58		
14.28	1.96	3.52	.765
14.91		3.74	
15.45		3.82	.813
16.48		3.86	.862
17.36	2.26		
17.44		3.80	
17.83		3.76	.931
19.99		3.41	1.04
21.30		3.17	
21.43	2.44		
23.23		2.82	
25.00	2.50		
25.16		2.50	

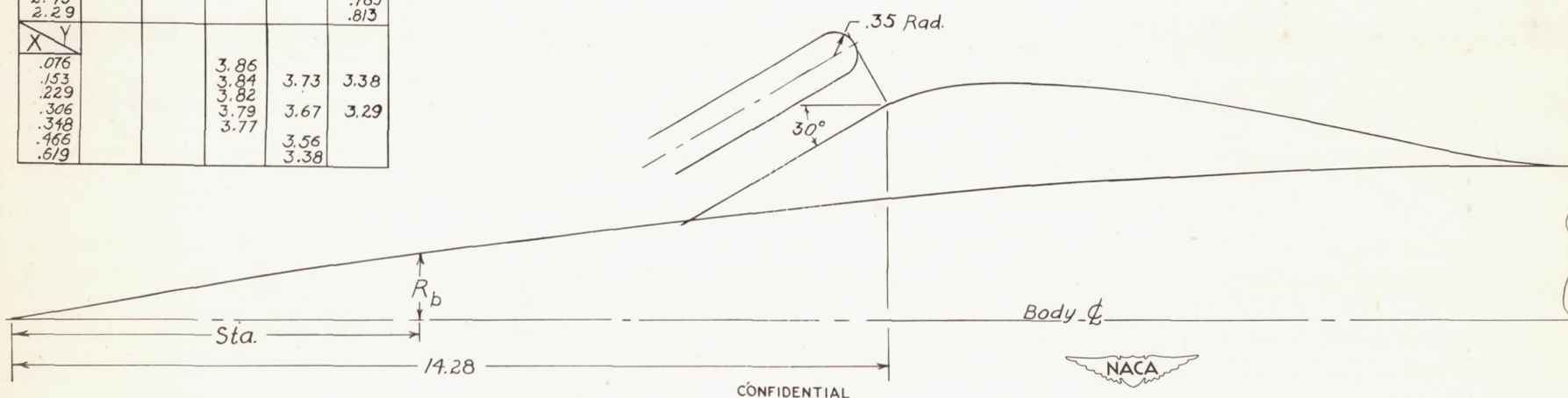
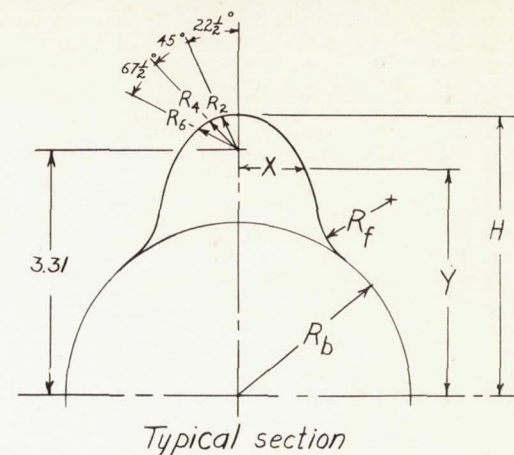
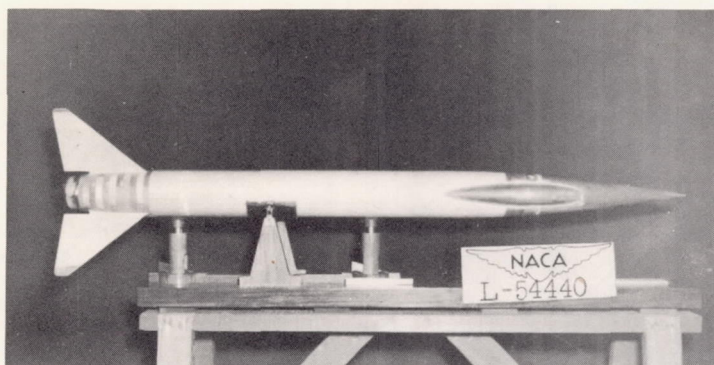
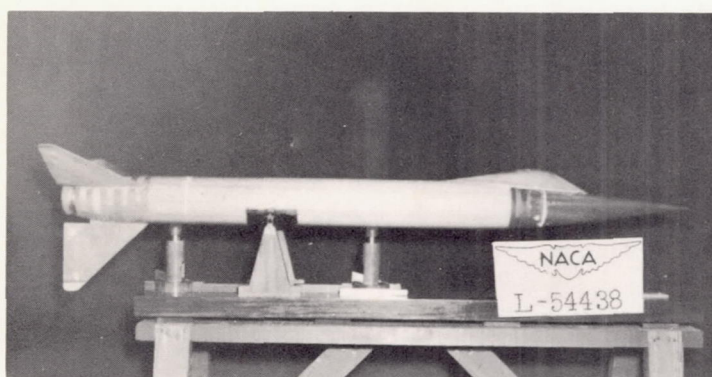


Figure 2.- Details of body nose and canopy
All dimensions are inches.

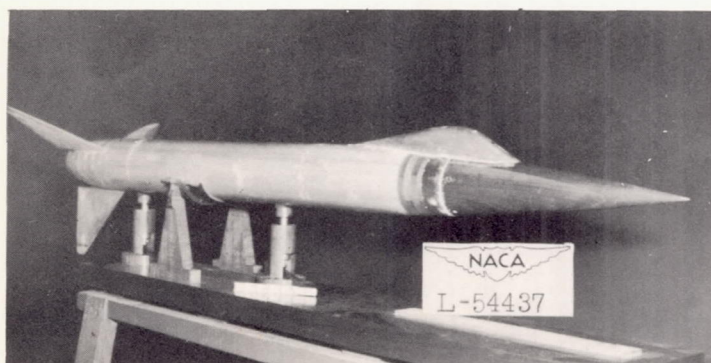
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(a) Top view.



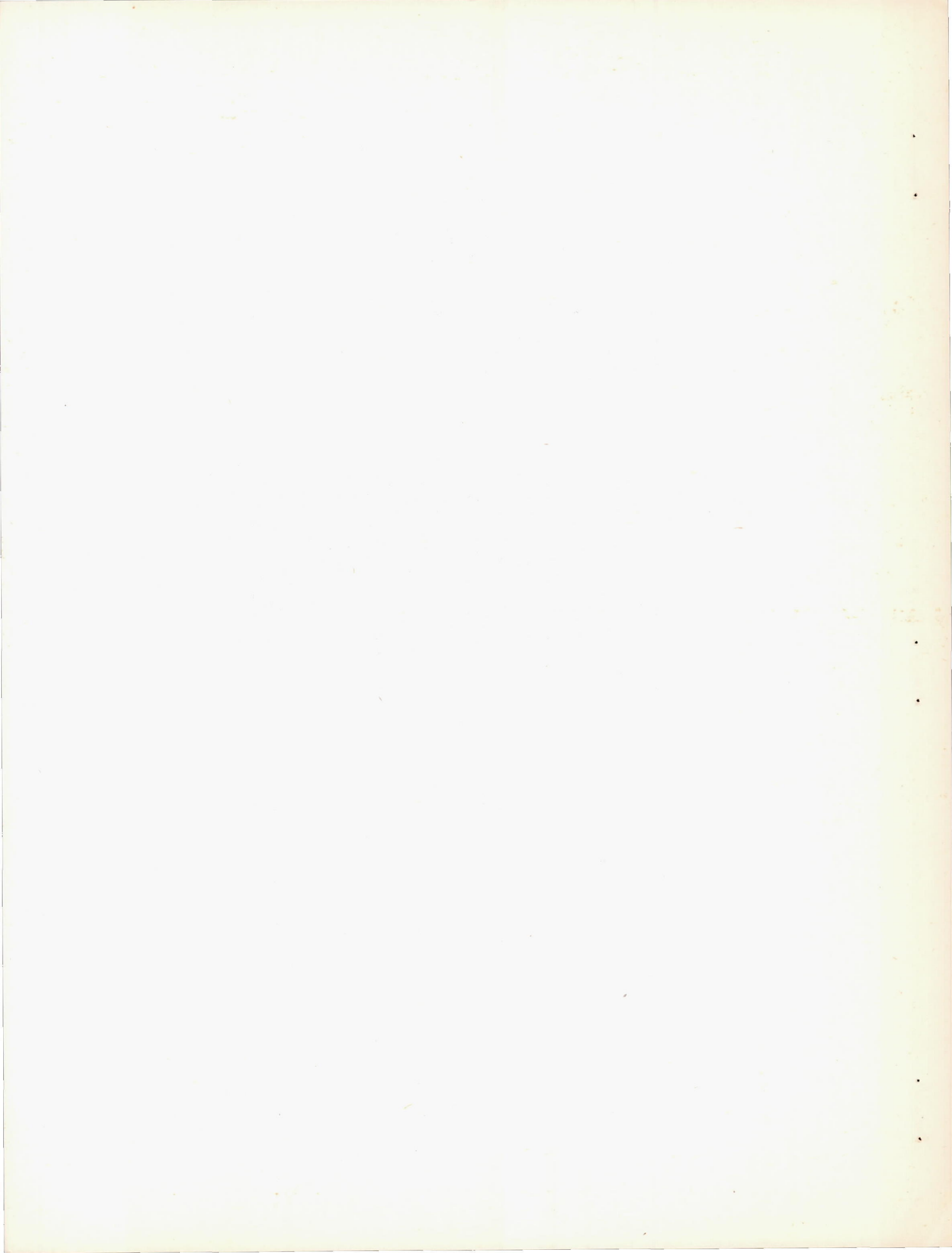
(b) Side view.



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(c) Three-quarter front view.

Figure 3.- Photographs of NACA RM-2 model equipped with a pilot's canopy.



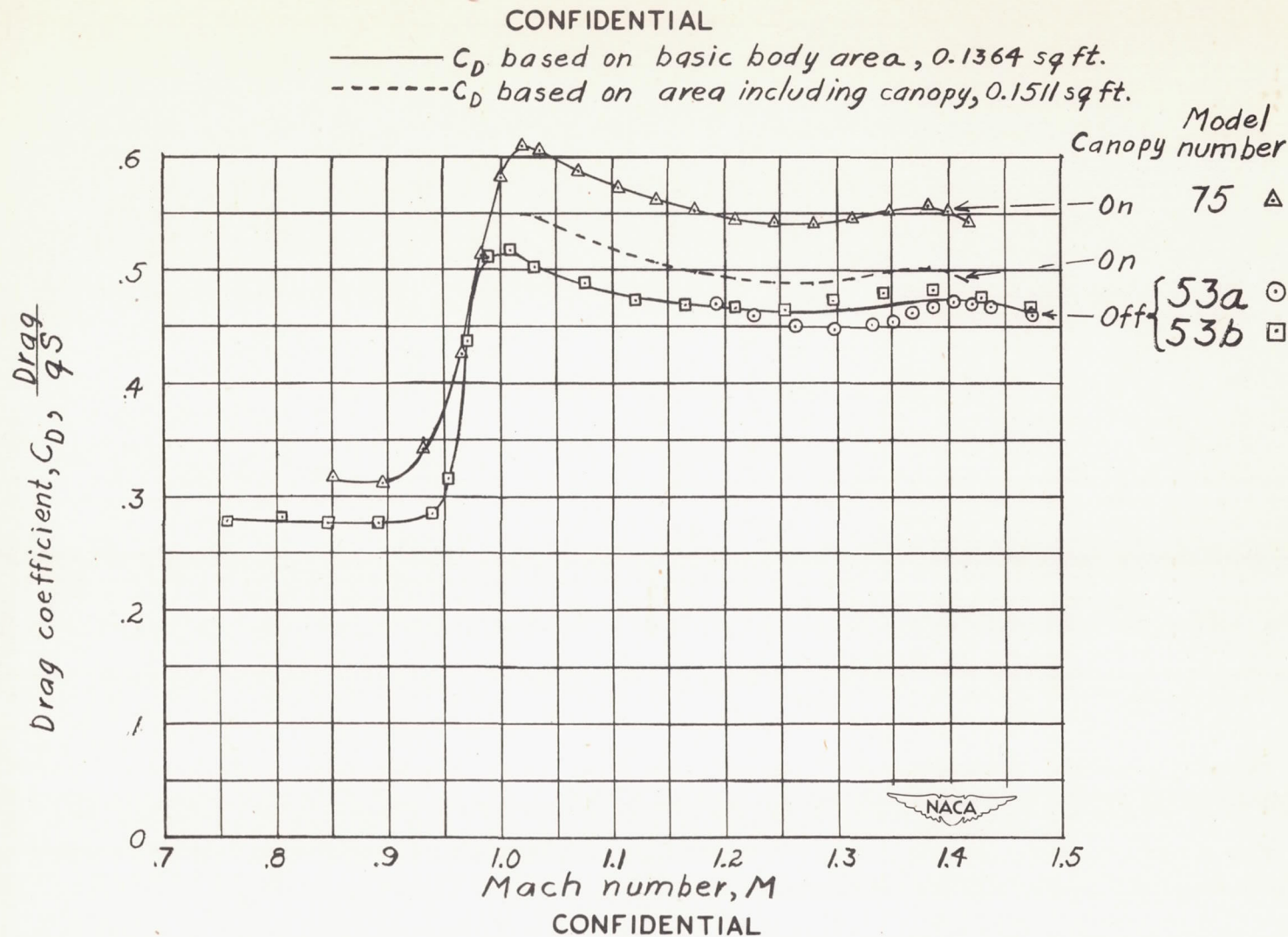


Figure 4.- Drag data for an NACA RM-2 model with and without pilot's canopy. Rocket model flight tests.